Forest Health Protection
Pacific Southwest Region

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To: Dave Myers, Forest Supervisor, Shasta-Trinity National Forest
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Subject: Potential Treatment Of Conifer Stumps To Prevent Heterobasidion Root Disease In The Areas Affected By Wildfire On The Shasta-Trinity and Six Rivers National Forests In 2015 (FHP Report No. N16-01)

In the summer of 2015, the Shasta-Trinity and Six Rivers National forests experienced wildfire over 212,300 acres as a result of lightning. Planning for post-fire recovery treatments is currently underway. As part of that effort, I was asked by Shasta-Trinity National Forest Silviculturists Todd Hamilton and Keli McElroy to provide recommendations on whether treatment of stumps with a borate fungicide immediately following cutting would be helpful in reducing the establishment of new infection centers of Heterobasidion (annosus) root disease in the Fork, Mad River, River, Route, South/Saddle Fire Complex areas.

Treatment of freshly-cut stumps with either powdered or liquid EPA-registered borate compounds such as Sporax or Cellu-Treat has been found to be highly effective in preventing the spread of Heterobasidion root disease to adjacent host trees. This is done by preventing the colonization of stumps by aerially-disseminated fungal pathogen spores, which can then germinate and grow throughout the stump, infecting the roots of surrounding uninfected living trees via underground root-root contacts. At the present time, only the liquid formulation (Cellu-Treat) is commercially available, though it is still permissible to apply remaining supplies of Sporax, the powdered formulation. A 2450/3400 letter from Regional Forester Randy Moore to Region 5 Forest Supervisors (darted May 13, 2013) stated that “New information from Region 5 State and Private Forestry (S&PF) forest pathologists indicates that stumps of trees affected by fire that have been dead less than 18 months are also susceptible to *Heterobasidion spp*. Therefore, treatment of these stumps is also important. Areas affected by the fires in the five complexes clearly fall under this time frame.

A general recommendation in the Forest Service Handbook for National Forest lands in Region 5 (FSH 3409.11, Chapter 60, R5 Supplement 3409.11-2010-1) is to treat freshly-cut stumps that are 14 inches or larger in diameter in general forest land when, and in developed recreation areas or areas with high-value facilities or trees, to treat all stumps larger than 3 inches in diameter. While the 14-inch recommendation is mostly applicable to eastside pine stands, we often use it as a rule of thumb for westside pine and other conifer stands as well. However, in the end, the final decision on whether or not to treat rests with the appropriate line officer, who can base that decision on information provided by local Forest Health Protection staff such as myself.

The decision on whether or not to treat often depends on whether or not Heterobasidion root disease is present in the general vicinity of the area under consideration. In this regard, the Handbook states that “If reliable surveys or biological evaluations conducted now, or in the past, indicate the disease is not present in the stand being managed, nor in neighboring stands that are within several miles, then there is no need to take preventative measures (apply borax) to prevent infection of cut stumps.” Although *Heterobasidion spp*. spores can travel long distances, I’ve considered the effective distance to be about three miles.

The areas in and around the five fire complexes have not been intensively surveyed for Heterobasidion root disease. In general, Heterobasidion root disease is scattered throughout much of the Shasta-Trinity and Six Rivers National Forests, but is much more common on the east side of the Shasta-Trinity than on the rest of the Forest or on the Six Rivers. However, in the seventeen years that I’ve been in Redding, I have not spent extensive amounts of time looking for Heterobasidion root disease in these west-side areas, nor have I been asked provide assistance with regard to Heterobasidion root disease concerns in these locations. Todd Hamilton likewise asked local Ranger District Foresters for their observations, and they likewise confirmed that while the disease is found occasionally, it is not widespread or very common.

To further assess the potential presence or absence of Heterobasidion root disease, I asked Leo Liu (GIS/Remote Sensing Analyst for Region 5 Forest Health Protection) to run a query in the CAIDA (California Insect and Disease Assessment) database to see if there have been any past reports of the root disease in or around the five fire areas. The CAIDA database is a geospatial database that contains historical Forest Health Protection insect and disease detection, survey and evaluation reports for the last 50-plus years. Note that CAIDA is a historical database, not a systematic survey. The results from the queries are in Figures 1-5. The yellow circles each represent a report of the disease.

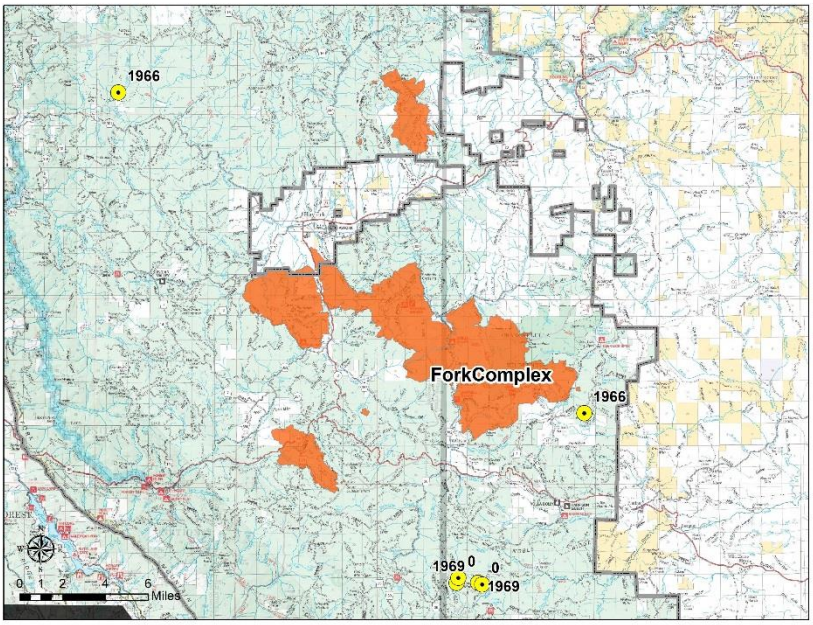

Figure 1. Historical reports of Heterobasidion root disease in the vicinity of the Fork Fire Complex from the CAIDA database.

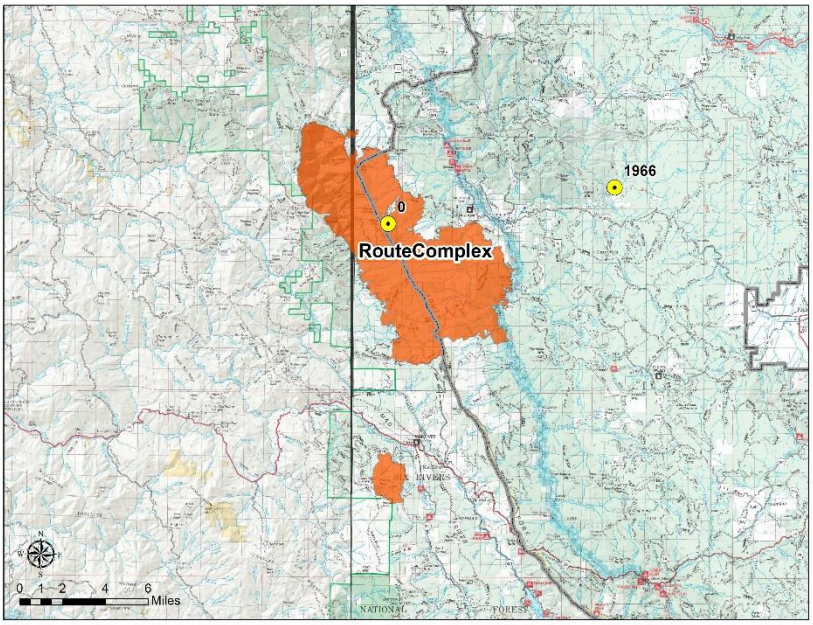

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Figure 2. Historical reports of Heterobasidion root disease in the vicinity of the Route Fire Complex from the CAIDA database.

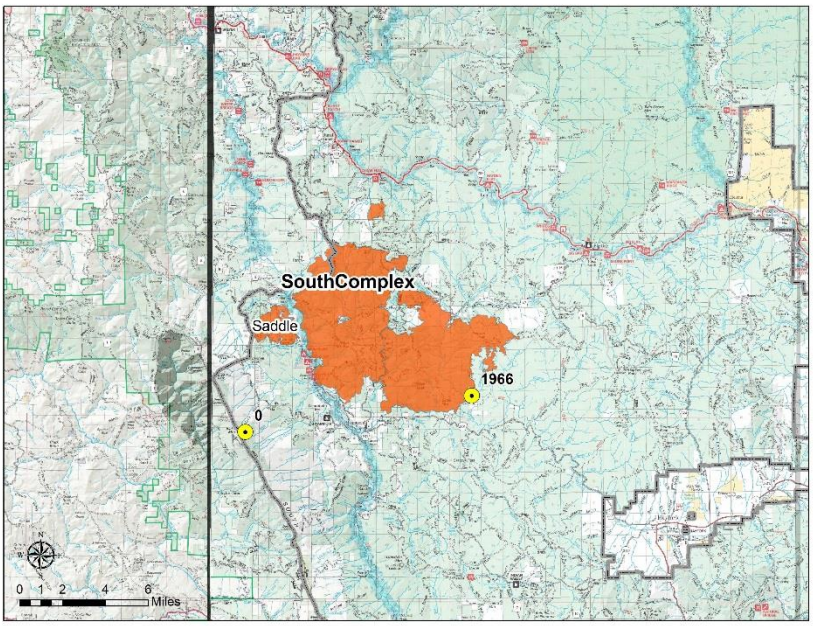

Figure 3. Historical reports of Heterobasidion root disease in the vicinity of the South/Saddle Fire Complexes from the CAIDA database.

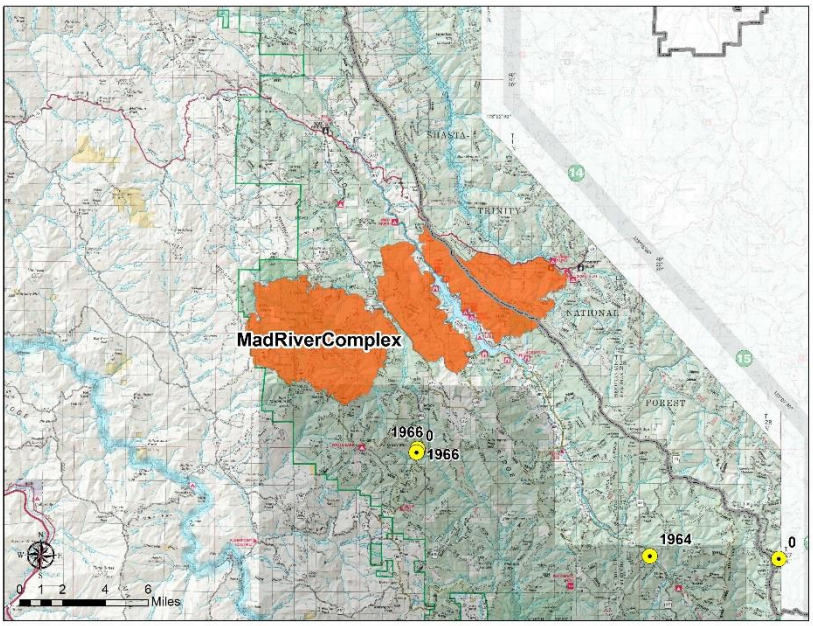

Figure 4. Historical reports of Heterobasidion root disease in the vicinity of the Mad River Fire Complex from the CAIDA database.

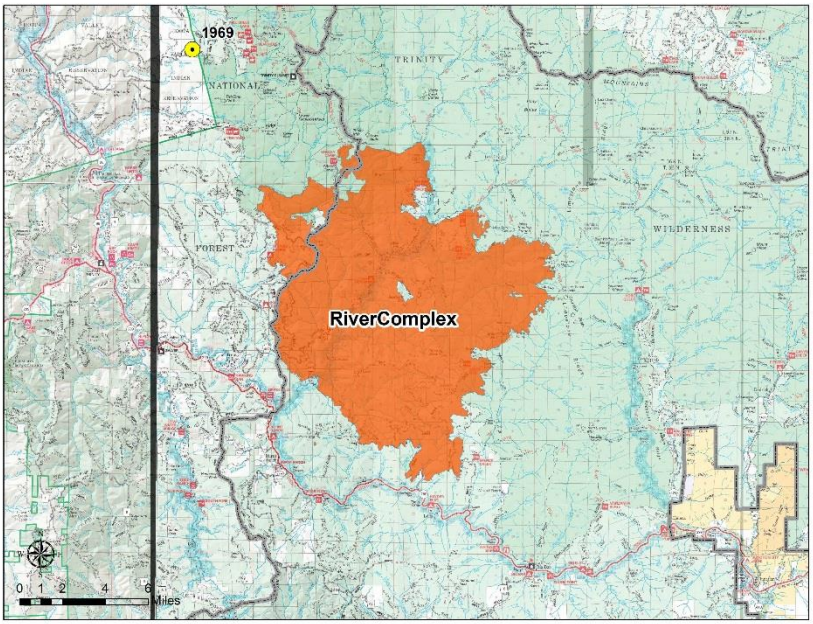

Figure 5. Historical reports of Heterobasidion root disease in the vicinity of the River Fire Complex from the CAIDA database.

The CAIDA database reports are summarized in Table 1. As expected, the CAIDA database showed relatively few Heterobasidion root disease reports in or near the fire complex areas. However, the database showed that the disease has been reported

Table 1. Heterobasidion Root Disease (HRD) reports within and outside 2015 Shasta-Trinity National Forest and Six Rivers National Forest fire complex perimeters from the CAIDA database.

Fire Complex	# HRD Reports Within Fire Perimeter	Miles To Closest HRD Report	# HRD Reports Within Or Up To 3 Miles Away	# HRD Reports 3-10 Miles Away	# HRD Reports 10-15 Miles Away
Fork	0	1	1	4	1
Route	1	Within	1	1	0
South/Saddle	1	Within	1	1	0
Mad River	0	3.5	0	2	2
River	0	7	0	1	0

within the perimeters of the Route and South/Saddle Fire Complexes, and has been reported within three miles of the Fork Fire. The nearest reports for the Mad River and River Complex Fires were 3.5 and 7 miles, respectively.

Recommendations And Conclusions

It is important to recognize that the CAIDA Database is not a systematic survey. It merely contains pest detection reports that have been submitted to Forest Health Protection and CALFIRE over the last 50-plus years. In my opinion, the best use of the CAIDA database is to provide an indication of whether or not the pathogen may reasonably be expected to be present in or near a particular area. Additional areas with unreported Heterobasidion root disease may easily be present, and it is possible (though unlikely) that the fungal pathogen may have died out of some of the areas where it had been previously reported.

In absence of specific survey data, it's impossible to tell how much of the area within the fire complexes is within three miles of a root disease center, and thus is susceptible to the establishment of new root disease centers through the colonization of freshly cut stumps. The CAIDA database demonstrates that Heterobasidion root disease has been present in the general vicinity of each of the complexes. However, the relatively low number of reports indicates that the pathogen is probably present only in a relatively low number of scattered root disease centers.

In the end, the decision to treat freshly cut stumps is somewhat of a judgement call. Ample evidence exists to indicate that there is a potential for the establishment of new root disease centers if freshly cut stumps are not treated with Sporax or Cellu-Treat. However, because of the relatively low amount of root disease in the area, the number of new root disease centers that will be established is likely to be low, particularly when compared to areas where the pathogen is more widespread and extensively distributed.

The bottom line is that if you want to be sure to minimize the establishment of new Heterobasidion root disease centers, then I recommend that you go ahead and treat the stumps. I've always considered the treatment of stumps to be a form of

"cheap insurance", and recommend that it be done whenever possible if the disease is present in any amount. However, if operational or other constraints limits the ability of the Forest to implement stump treatment, then I have no major problems or concerns with foregoing treatment. In addition, if the Forests want to specify particular areas within the fire complexes for treatment, then consideration might be given to treating areas near power line corridors or roads so that the chance for future root disease-related problems is limited. Also, if the Forests want to prioritize individual complexes for treatment, then I'd give the highest priority to the Route and South Complexes, where the disease has been reported within the burn perimeter, followed by the Fork and the Mad River Complexes, where the disease has been reported fairly close to the fire zone. The River Complex, where the closest (and only) reported instance of Heterobasidion root disease was 7 miles away would receive the lowest priority for treatment.

Regardless of the above recommendations, be aware that in all the treated areas, freshly cut conifers that are 3-inches in diameter or larger in developed recreation areas or in high-value sites must be treated, as stipulated in both the Forest Service Manual (FSM 2300, R5 Supplement 2300-92-1) and Handbook (FSH 3409.11, Chapter 60, R5 Supplement 3409.11-2010-1).

If you have any questions regarding this report or need additional information, please contact me at 530-226-2436.

/s/ Pete Angwin

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